

Application of Advanced Electromagnetic Arrays to High Efficiency, High Bandwidth, Redundant Linear Actuators, Phase II

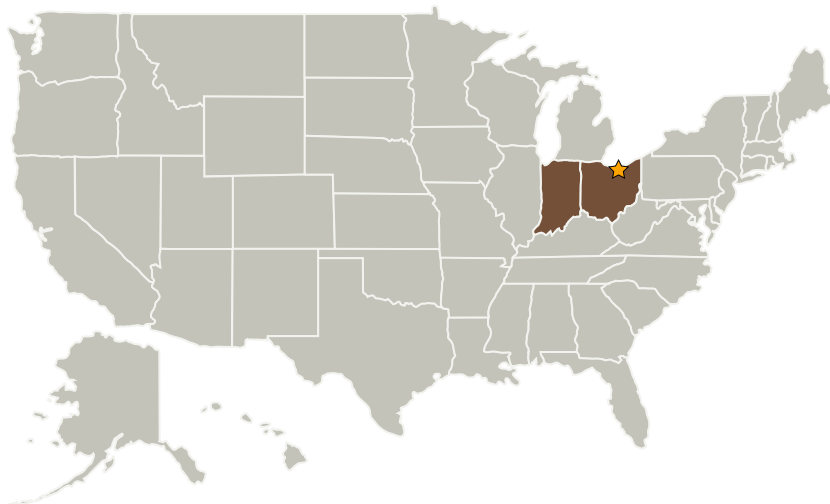
Completed Technology Project (2005 - 2007)



Project Introduction

There is a need to develop electromechanical actuators to improve performance beyond that of hydraulic devices currently being used in numerous aerospace and industrial applications. Beginning with NASA-provided performance specifications, this Phase I SBIR effort has employed a systems approach to develop and optimize the design of an electromechanical linear actuator appropriate for demanding launch vehicle thrust vector and control surface applications. The actuator system design consists of a high-efficiency permanent magnet motor with redundant current channels for system fault tolerance, multiple high-bandwidth controllers that are matched to motor characteristics, and a compact roller-screw mechanism, along with housing and supporting elements. A system of innovations was necessary to overcome the inherent limitations of today's electromechanical actuators, which were developed based on the limitations of traditional motors, power electronics, and available actuator hardware. The projected weight of the actuator prototype to be built in Phase II is less than the existing hydraulic systems currently in use by NASA, and half of previous electric prototypes having the same performance specification. Working with a major aerospace company partner, the Phase II Team will deliver a tested prototype actuator system as a basis for future advanced commercial products.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Kinetic Art and Technology Corporation	Supporting Organization	Industry	Greenville, Indiana

Primary U.S. Work Locations	
Indiana	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.3 Control Technologies
 - └ TX17.3.4 Control Force/Torque Actuators